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(54) Ground treatment

(57) A ground area can be  
treated with a substance, such as a  
pheromone, which is absorbed within  
and dispersed throughout a body of  
synthetic polymeric material, the

treatment substance being  
transferable out of the polymeric  
material to its environment.

The polymeric material may be  
formed from an acrylamide monomer  
cross-linked with an N,N'-methylene  
bisacrylamide.

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## SPECIFICATION

## Ground treatment

This invention relates to the treatment of ground areas and a principal object of the invention is to provide a method whereby a ground area can be treated with a substance easily and conveniently and in such a manner as to facilitate controlled release of said substance.

According to one aspect of the present invention therefore there is provided a method of treating a ground area with a substance wherein said substance is applied to said ground area absorbed within a body of polymeric material, said substance being dispersed throughout the polymeric material in a state in which it is available for transfer to the environment thereof.

According to a second aspect of the invention there is provided a method of treating a ground area with a substance capable of dispersion in the atmosphere wherein said substance is applied to said ground area in a liquid medium which is absorbed by a synthetic polymeric material, said polymeric material having the property of absorbing a volume of said liquid medium appreciably greater than its own volume in a state in which said absorbed medium is available for transfer out of the polymeric material to the environment thereof.

With this method it will be appreciated that the absorbed condition of the said substance can facilitate the application of such substance to the ground area to be treated whilst facilitating controlled release thereof into the atmosphere in the vicinity of the ground area.

The method of the invention may be utilised in any suitable context and correspondingly the said substance may be of any suitable nature. It is visualised, however, that the method of the invention may find particular application in the context of the controlled release of odiferous materials for the purpose of the control of animal life, especially insect life.

In many regions of the world animal life, particularly insects, present a serious problem, for example in terms of transmission of disease or in terms of damage to cultivated crops. The method of the invention can afford protection in this respect in so far as a substance is used which disperses in the atmosphere and acts either to repel or to attract one or more species of animal life. For example said substance may comprise a natural or synthetic pheromone appropriate to the animal life to be attracted or repelled. A pheromone is a substance secreted by an animal which influences the behaviour of other individuals of the same species. In this way, the animal life in question can be repelled away from an area to be protected, or can be attracted to an adjacent area and thereby diverted away from the area to be protected. Where attraction is utilised, this may be applied in conjunction with a procedure effective in the zone of attraction which destroys or incapacitates the attracted animal life, such procedure involving for example spraying

with insect killing chemicals or the like.

The liquid medium containing the said substance may be water and the arrangement may be such that the medium migrates from the polymeric material and releases the said substance to the atmosphere possibly as a consequence of or as facilitated by drying thereof.

With regard to the polymeric material this may be any suitable compound or mixture of compounds. However, in a particularly preferred embodiment the material is an anionic polymer, especially an acrylamide polymer formed by polymerising an acrylamide monomer in the presence of N,N'-methylene bisacrylamide as cross-linking agent, the reaction condition being selected to give in effect a three-dimensional polymeric matrix. The polymer may be in the form of particles or granules having the property of absorbing up to say 30 or 35 times its own volume of water by swelling of the particles to form beads having a firm gel-like consistency. If desired the cross-linking may be such as to impart a stocky or tacky consistency so that the material can readily adhere, for example, to plants. This polymeric material is described in our copending Application 8318488 to which reference is made for further details thereof. The treatment substance may be introduced during formation of the polymer so that droplets or particles become entrapped within the polymeric matrix whereby migration thereof to the surface of the material occurs at a slow rate.

In performing the method of the invention, the said polymeric material with the absorbed substance-containing liquid medium may be spread over the ground area in any suitable manner for example by sprinkling over the surface of the ground or by mixing the material with surface soil or sand of the ground area using any suitable manual or mechanical technique. Alternatively the said polymeric material may be disposed in receptacles or the like at appropriate positions in relation to the ground area to be treated.

The said polymeric material may be utilised not only to provide a carrier for the said substance but also to perform one or more other functions. Thus, for example, and as described in the aforesaid copending Application, the polymeric material may be incorporated in a land area to improve the structural properties thereof (as by restricting wind or water erosion) and/or may be mixed with one or more particulate growing materials, such as soil, sand, rockwool, peat and the like, to give a growing medium having good plant growth properties. Also as described in said copending Application, other materials such as plant nutrients, binding materials and the like may be incorporated as desired and as appropriate. In particular, the method of the present invention may be performed in conjunction with performance of the method of the aforementioned copending Patent Application and all aspects described in such Application can therefore be utilised, as appropriate, in the present invention.

In one example the polymeric material is

formed as follows:

- Acrylamide monomer (such as the material sold by BDH under the trade name ACRYLOGEL) is mixed with additional N,N'-methylenebisacrylamide cross-linking agent in a deoxygenated aqueous medium containing ammonium persulphate and tetramethylethylenediamine as initiators, a small quantity of a detergent (such as that sold under the trade name TRITON X-100), and a pheromone (such as tetradecenyl acetate).

The proportions may be as follows in 100 ml of aqueous solution:

- 5 g pheromone
  - 20 g acrylogel
  - 1 ml tetramethylethylenediamine
  - 4 ml 7% ammonium persulphate
  - 0 to 4 g methylene bisacrylamide
  - 50 ml triton X-100.
- The ingredients are well mixed and allowed to react exothermically. The detergent facilitates dispersal of pheromone particles or droplets and a highly cross-linked polymeric matrix is formed. The resulting product is a "rubbery" gel containing a widely-dispersed finely-divided pheromone suspension entrapped in the polymer matrix. The gel may be dried and, if formed as a slab or like body, may be sliced, diced, minced or otherwise divided into small particles. Alternatively, the gel may be used as a slab or may be cast as beads, granules, flakes, strips or any other suitable shape.

- The product may be applied to plants individually or by spraying or by scattering on the soil surface or by incorporation into the soil or rooting compost or by application in traps or mazes.

- The invention is not intended to be restricted to the above details. Thus, for example, additionally or alternatively to a pheromone it is possible to use an insecticide, acaricide, nematocide, fungicide, bactericide or growth hormones.

## CLAIMS

1. A method of treating a ground area with a substance wherein said substance is applied to said ground area absorbed within a body of polymeric material, said substance being dispersed throughout the polymeric material in a state in which it is available for transfer to the environment thereof.
2. A method of treating a ground area with a substance capable of dispersion in the atmosphere wherein said substance is applied to said ground area in a liquid medium which is absorbed by a synthetic polymeric material, said polymeric material having the property of absorbing a volume of said liquid medium appreciably greater than its own volume in a state in which said absorbed medium is available for transfer out of the polymeric material to the environment thereof.
3. A method according to claim 1 or 2 wherein said treatment substance comprises a pheromone.
4. A method according to any one of claims 1 to 3 wherein said polymeric material is formed from an acrylamide monomer cross-linked with N,N'-methylene bisacrylamide.
5. A treatment material for use in performing the method of any one of claims 1 to 4 comprising a treatment substance dispersed within a body of a synthetic polymeric material so as to be available for transfer out of said polymeric material to the environment thereof.
6. A treatment material according to claim 5 wherein said substance comprises a pheromone.
7. A treatment material according to claim 5 or 6 wherein said polymeric material is formed from an acrylamide monomer cross-linked with N,N'-methylene bisacrylamide.
8. A method and a treatment material substantially as hereinbefore described in the Example.

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